

Abstract Title Page
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Title: Spanish Instruction in Head Start and Dual Language Learners' Achievement

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Abstract Body

Limit 4 pages single-spaced.

Background / Context:

Prior research suggests that Spanish-speaking Dual Language Learners (DLLs) – young children who must master two languages simultaneously, their home language and English (Espinosa, 2013) – differentially benefit from quality ECE, and in particular from Head Start, compared with children of other subgroups and monolingual-English children (Buysse, Peisner-Feinberg, Pérez, Hammer, & Knowles, 2014; Gormley, 2008; Loeb, Bridges, Bassok, Fuller, & Rumberger, 2007; U.S. DHHS, 2010a).

Despite the positive impacts of ECE for Spanish-speaking DLLs, however, the literature has not sufficiently investigated the mechanisms underlying this finding, or what may account for these differential benefits. One idea that has garnered attention in recent years through developmental policy reports (Mancilla-Martinez & Lesaux, 2014; McCabe et al., 2013), research articles (Barnett, Yarosz, Thomas, Jung, & Blanco, 2007; Pérez, Tabors, & Lopez, 2007), and Head Start mandates (U.S. DHHS, 2008) is Spanish language instruction in the classroom. Such instruction may be an important pathway through which DLL children can maximize their learning experiences in ECE as it underscores the importance of supporting children's home language in English-dominant child care programs and promoting the linguistic context in which DLL children are served. Therefore, understanding whether the effects of programs like Head Start on children's development differ by use of Spanish instruction in the classroom remains a key issue, and in particular whether such instruction contributes to English language academic skills is critical and largely unknown.

Purpose / Objective / Research Question / Focus of Study:

The purpose of the current study is to determine whether Spanish language instruction is associated with school readiness skills for Head Start-eligible Spanish-speaking DLL children. It examines the relationship between Spanish instruction used by caregivers in Head Start settings and DLL children's subsequent English language academic achievement, as this may prove essential for their kindergarten readiness.

Setting:

This study uses data from the two largest, nationally representative datasets on Head Start – the Head Start Impact Study (HSIS; U.S. DHHS, 2002-2006) and the Head Start Family and Child Experiences Survey, 2009 Cohort (FACES-2009; U.S. DHHS, 2009-2013).

Population / Participants / Subjects:

The population of interest in this study is Spanish-speaking DLLs, which had a very specific classification criteria. In HSIS, prior to program entry in the fall of 2002, treatment and control group children were administered a battery of assessments as a baseline measure of academic achievement. The language of this child assessment was chosen by HSIS as follows. At the start of the study in fall 2002, information was collected on each child's language ability. Assessors asked the child's primary caregiver three questions: (1) What language does the child speak most

often at home?; (2) What language does the child speak most often at this child care setting?; and (3) What language does it appear this child prefers to speak? Children were tested in the language in which at least two of the three responses were the same (U.S. DHHS, Technical Report, 2010). Children were classified as a Spanish-speaking DLL if they required assessment in Spanish at baseline. About 25% of the overall study sample required baseline assessment in Spanish ($N = 1,141$).

In FACES-2009, the same three classification questions as in HSIS were used. If the answer to two out of the three questions was Spanish, the child was considered a Spanish-speaking DLL. Categorized this way, about 25% of the FACES-2009 sample ($N = 825$) was classified as Spanish-speaking DLLs.

Intervention / Program / Practice:

This study is based on data from the two largest, nationally representative datasets on Head Start children, families, and programs. The first was the random-assignment Head Start Impact Study (HSIS), which was designed to estimate the causal impact of Head Start on children's school readiness skills and parenting practices, as well as to determine under what circumstances Head Start achieved its greatest impact and for which children (U.S. DHHS, Final Report, 2010). The second was the Head Start Child and Family Experiences Survey, 2009 Cohort (FACES-2009), a longitudinal study of program performance, and specifically the population served; staff qualifications, credentials, and opinions; Head Start classroom practices and quality measures; and child and family outcomes (U.S. DHHS, 2011).

Research Design:

Despite the emerging empirical body of research on the differential benefits of ECE for Spanish-speaking DLLs, whether Spanish language instruction contributes to these benefits in various ECE settings such as Head Start is still an empirical question. To address this gap, therefore, the present study tests whether Spanish language instruction in Head Start boosts critical English academic school readiness skills, including oral language.

Consequently, the primary research questions are: 1) Are there main effects of Spanish language instruction on Spanish-speaking DLL children's academic school readiness skills?; and 2) Does Head Start differentially benefit Spanish-speaking DLL children instructed in Spanish?

Data Collection and Analysis:

The analysis for this study's research questions was a three-step process in which the analytic sample was restricted to Spanish-speaking DLLs in all cases. First, using FACES-2009, residualized growth models were used to estimate associations between Spanish language instruction and Spanish-speaking DLLs' English academic achievement. Specifically, estimated regressions tested for main effects of Spanish language classroom instruction in Head Start on English receptive vocabulary, early literacy, and early math skills. A parallel non-experimental analysis was then performed using the HSIS to estimate the same associations for children who randomly assigned to Head Start.

Thus, the final regression model for both FACES-2009 and the HSIS was:

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 (SPANISH\ INSTRUCTION)_t + \gamma COVARIATES_{t-1} + e_t,$$

where Y_t was the outcome variable of interest after one year; Y_{t-1} was the lagged outcome variable at baseline; $SPANISH\ INSTRUCTION_t$ was a dummy variable indicating whether a child attended a Head Start center where they were taught in Spanish; $COVARIATES_{t-1}$ was a vector of additional demographic covariates; and e_t was an error term. Although this analysis was non-experimental, the use of both datasets enabled us to explore the robustness of the associations between Spanish language instruction and Spanish-speaking DLLs' English language academic school readiness skills.

To answer the second research question, this study then took advantage of the random assignment feature of the HSIS and used the entire Spanish-speaking DLL sample to estimate whether Head Start program impacts were differentially beneficial for Spanish-speaking DLLs instructed in Spanish. This analysis compared Spanish-speaking DLLs in Spanish instruction Head Start classrooms with DLL children in non-Spanish instruction Head Start classrooms as well as DLLs in the control condition. It estimated regressions including Spanish language instruction, random assignment to Head Start, and an interaction term between these variables on English receptive vocabulary, early literacy, and early math skills.

Thus, the final interacted regression model was:

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 (SPANISH\ INSTRUCTION)_t + \beta_3 TX + \beta_4 (SPANISH\ INSTRUCTION_t \times TX) + \gamma COVARIATES_{t-1} + e_t,$$

where $SPANISH\ INSTRUCTION_t \times TX$ was the interaction of Spanish instruction and Head Start.

Given the strong potential for Head Start center-level variation, all of the models included Head Start center-level fixed effects with the standard errors properly adjusted for weighting and clustering. The use of both datasets offered a test of replication on this important issue.

Findings / Results:

Results for the first research question on whether there was a main effect of Spanish language instruction on Spanish-speaking DLL children's English academic school readiness skills are displayed in Table 1. In HSIS, results indicate that Spanish-speaking DLL children instructed in Spanish in Head Start scored about 1/6 *SD* higher on English receptive vocabulary ($\beta = 0.16, p < .001$) compared with DLL children not instructed in Spanish. Interestingly, Spanish instruction in Head Start was not associated with the other English assessment outcomes of early literacy or early math. Similarly, in FACES-2009, Spanish-speaking DLL children instructed in Spanish in Head Start scored 1/5 *SD* higher on English receptive vocabulary ($\beta = 0.20, p < .05$) compared with DLL children not instructed in Spanish, and there were also null findings for the English outcomes of early literacy and early math.

{Insert Table 1}

Because this study analyzed two independent samples of Head Start programs, families and children, it supported a test of whether the coefficient estimates from HSIS and FACES-2009 were significantly different from each other using a two-sample test of independent means to see if the results from each dataset individually truly replicated across both. The *p*-value of the HSIS/FACES-2009 difference for English receptive vocabulary skills was .71. Because this value was far from statistically significant, results for the first research question appear to be robust across the two independent Head Start samples of HSIS and FACES-2009.

Results for the second research question on whether Head Start differentially benefits Spanish-speaking DLL children instructed in Spanish are displayed in Table 2. When interaction variables are included the models, the main effects of Spanish language instruction are those of control group children only. Consequently, for each outcome it is necessary to discuss the results for control group children first and then the Head Start children.

{Insert Table 2}

For English receptive vocabulary, there was a significant interaction between Spanish language and instruction and random assignment to Head Start on English receptive vocabulary skills ($\beta = 0.17, p < .001$) in that Spanish-speaking DLL children randomly assigned to Head Start and instructed in Spanish scored higher on English receptive vocabulary skills than both Spanish-speaking DLL children randomly assigned to Head Start but *not* instructed in Spanish and Spanish-speaking DLL children in the control condition. As with the first research question, Spanish instruction in Head Start was not associated with the other English assessment outcomes of early literacy or early math.

To better understand this interaction on English receptive vocabulary, Figure 1 shows predicted scores computed from the coefficient estimates in Table 3. As indicated by the three different groups, Spanish-speaking DLL children randomly assigned to Head Start and instructed in Spanish had the highest English receptive vocabulary scores of all the groups. Their scores were significantly higher than those of DLL children assigned to Head Start but not instructed in Spanish as well as those of DLL children in the control condition.

{Insert Figure 1}

Conclusions:

This study suggests that there may be something fundamentally different about the way Spanish instruction impacts DLLs' receptive vocabulary skills compared with other domains including early literacy in Head Start. Perhaps when teachers use Spanish for instruction, it helps children better understand the correct meaning of English words, thus expanding their English vocabulary. In addition, hearing more language generally and in both languages may promote better oral language skills overall. This is consistent with the findings of Core and colleagues (2013) and Hoff (2013) who found that when total language was considered, DLL children performed on par or higher than monolingual-English speakers on measures of oral language.

Conversely, with other early skills such as early literacy, perhaps instructing children in Spanish was not necessary to promote these skills due to the high degree of cross-linguistic transfer in areas such as phonological awareness and letter-word knowledge (August & Shanahan, 2006; Castro, Pérez, Dickenson, & Frede, 2011; Dickinson, McCabe, Clark-Chiarelli, & Wolf, 2004; Rinaldi & Pérez, 2008). Because of the likelihood of cross-linguistic transfer in these key literacy areas, and given that many DLL children have a high degree of exposure to English before coming to Head Start from sources like television and media even if they use Spanish exclusively in the home, there was no added benefit for the teacher instructing the children in Spanish on these English outcome domains.

Although the second study research question was able to take advantage of the experimental nature of the HSIS, this was not possible for the first research question and the results reported here for this question are not causal. Nonetheless, because the findings replicated across two large, independent samples of Head Start children, families, and programs, these results are likely to be more robust than would be possible from either sample alone.

Appendices

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Appendix A. References

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Appendix B. Tables and Figures

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Table 1

Regressions Relating Spanish Classroom Instruction with Academic Outcomes in IISIS and FACES-2009

	Outcomes						<i>p-Value of HSIS/FACES-2009 Difference</i>
	HSIS			FACES-2009			
	<i>Receptive Vocabulary:</i>	<i>Early Literacy:</i>	<i>Early Math:</i>	<i>Receptive Vocabulary:</i>	<i>Early Literacy:</i>	<i>Early Math:</i>	
	<i>PPVT</i>	<i>WJ Letter-Word</i>	<i>WJ Applied Problems</i>	<i>PPVT</i>	<i>WJ Letter-Word</i>	<i>WJ Applied Problems</i>	
Teach Children in Spanish	0.16*** (0.06)	-0.06 (0.05)	-0.04 (0.03)	0.20* (0.09)	-0.20 (0.11)	-0.05 (0.04)	0.71
<i>N</i>	590	590	590	472	472	472	
<i>R</i> ²	0.58	0.52	0.51	0.31	0.43	0.48	

Note. Outcomes are standardized. Weight-adjusted standard errors in parentheses.

* $p < 0.05$. *** $p < 0.001$.

PPVT= Peabody Picture Vocabulary Test. WJ = Woodcock-Johnson. Teach in Spanish is teacher report. Head Start center-level fixed effects included in all models. Demographic covariates (centered at mean): baseline achievement, child cohort, child gender, child disability status, maternal education, maternal marital status, caregiver depression, teenage mother status, caregiver age, and child age at spring assessment. HSIS weight used = CHSPR2003WTCA; FACES-2009 weight used = P21RA2WT.

Table 2

Regressions Relating Spanish Classroom Instruction, Assignment to Head Start, and their Interaction in HSIS

	<i>Outcomes</i>		
	<i>HSIS</i>		
	<i>Receptive Vocabulary: PPVT</i>	<i>Early Literacy: WJ Letter-Word</i>	<i>Early Math: WJ Applied Problems</i>
Teach Children in Spanish (Dummy)	0.11 (0.07)	0.03 (0.08)	-0.05 (0.06)
Treatment (Dummy Assignment to H.S.)	0.50** (0.15)	0.26 (0.16)	0.32*** (0.10)
Teach Children in Spanish x Treatment	0.17*** (0.04)	-0.04 (0.03)	0.02 (0.02)
<i>N</i>	935	935	935
<i>R</i> ²	0.58	0.51	0.50

Note. Outcomes are standardized. Standard errors in parentheses calculated using jackknife replicate weights.

** $p < 0.01$. *** $p < 0.001$.

PPVT= Peabody Picture Vocabulary Test. WJ = Woodcock-Johnson. Teach in Spanish is teacher report. Head Start center-level fixed effects included in all models. Demographic covariates (centered at mean): baseline achievement, child cohort, child gender, child disability status, maternal education, maternal marital status, caregiver depression, teenage mother status, caregiver age, child age at spring 2003 assessment, number of weeks elapsed between 09/01/02 and spring 2003 child assessment. HSIS weight used = CHSPR2003WTCA.

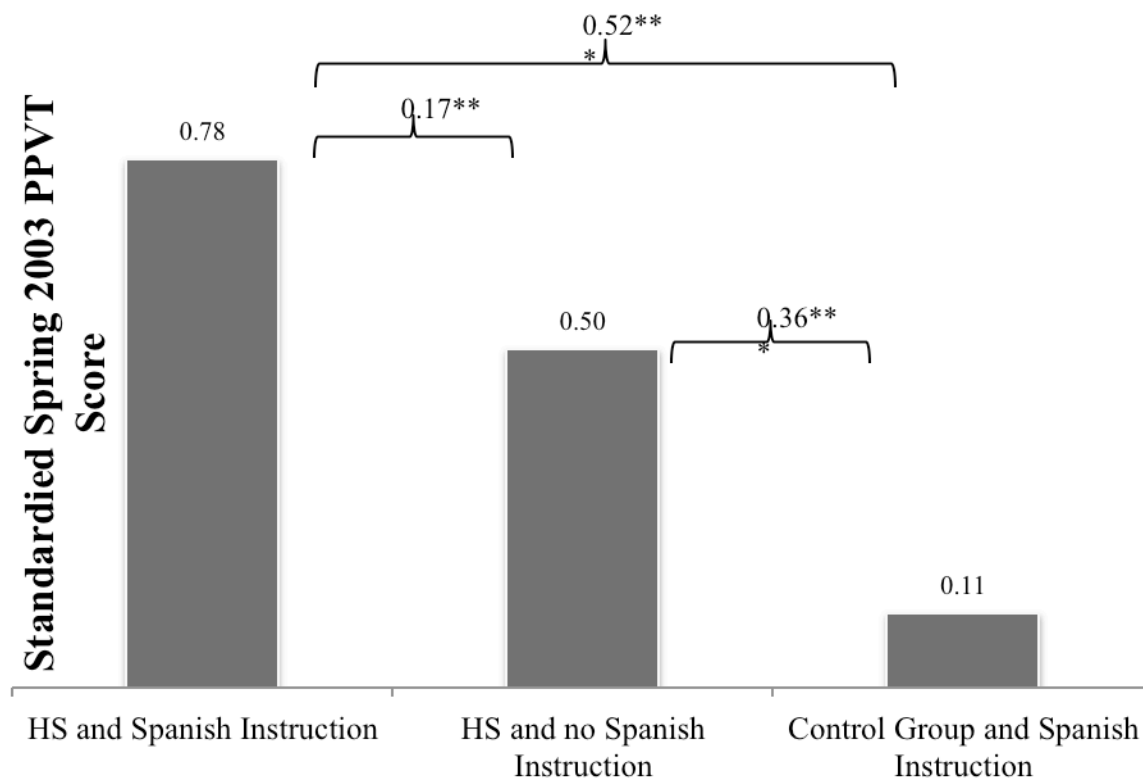


Figure 1. Predicted standardized spring 2003 PPVT scores by Spanish language instruction and random assignment to Head Start. (** $p < 0.01$.)